Purpose/Objective: Radiosurgery is nowadays a valid treatment option for patients with brain metastasis. In the last year the use of new drugs increases the life expectance of these patients and advances in oncologic technology allows accurate radiotherapy treatment with high dose delivery and sparing of normal tissue resulting in a higher disease control. We retrospectively analyzed the efficacy in patients who received GammaKnife radiosurgery (GKRS) at our institution.
Materials and Methods: Between October 2012 and July 2014, 187 brain metastases in 77 patients were treated with Gamma Knife single-fraction RS. Clinical demographic features and treatment data were collected.The rates of local and distant intracranial progression, predictors of individual tumor local control and overall survival were determined by statistical analysis.
Results: The mean age was 63 years (range: 25-87 years). The most common tumor histologies were non-small cell lung cancer (44 %), breast cancer (16 %) and melanoma (10 %) . Forty patients (52%) had a single metastasis, eight patients had more than 4 metastases with a maximum of eleven lesions in one patient. The most part of patients (62%) were in RPA class II and 38 % in RPA class I. Fifteen patients (20%) received a previous treatment for brain metastases: five patients surgical resection, eight whole brain radiotherapy, and two received both surgery and whole brain. Radiosurgery doses ranged between 15 Gy for lesions in critical site such as brainstem and 24 Gy for lesions with dimension less than 1 cm. Median survival after GKRS was 13.4 months (range: 0.2-22.6 months). Median time to local progression was 5.6 months (range: 0.2-22.6 months), with a local control rate of 76.6% at 1 year. Distant brain control was 74% at one year. At univariate analysis we found that age older than 60 years correlate with worse local control compared to youngest patients but the difference was not statistically significant (p=0.07). Patients with more than four lesions treated had a significant higher risk of local relapse (p=0.0003), but this data was possibly related to a selection bias. No patients developed a symptomatic radiation-induced treatment change on follow up MRIs.
Conclusions: GKRS appears to be a safe and an effective technique to treat single and multiple brain metastases.

EP-1358

Hemoptysis due to fungus ball after tuberculosis: natural history and role of radiotherapy

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Purpose/Objective: Not much is known about the natural history culminating in hemoptysis caused by aspergilloma (fungus ball) which colonizes caves of pulmonary tuberculosis previously acquired. Local treatment requires surgical resection in symptomatic cases, but in patients with surgical contraindications, radiotherapy has the potential to be effective, and less invasive.
Materials and Methods: Twenty-one patients with chronic necrotizing pulmonary aspergillosis were treated with conventional external-beam radiotherapy with a dose of 20 Gray, from 1990 to 2002. It is initially evaluated the time for the development of hemoptysis from the previous treatment of tuberculosis. Other outcomes were: change in performance status after 30 days of treatment, local failure-free survival and overall survival.
Results: The median time between the end of tuberculosis treatment and the development of hemoptysis due to aspergilloma was 9 years. With radiotherapy, there was general improvement and resolution of hemoptysis in all patients. During follow-up 4 failures occurred, with local failure-free survival of 82% at 5 years and overall survival of 59% at 5 years. Two patients died from recurrence of hemoptysis and two were rescued (cavernostomy and re-irradiation with 20 Gy). Presence of chronic obstructive pulmonary disease (p = 0.021) and female gender (p = 0.032) were significantly detrimental in relation to overall survival. No variable tested was related to local control.
Conclusions: Radiation therapy can be considered an effective alternative therapy to control bleeding due to fungus ball can impact on disease-free survival.

EP-1359

Avoidance of radiation induced alopecia en whole brain radiotherapy treatments with simultaneous integrated boost

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Purpose/Objective: Radiation-induced alopecia in hypofractionated whole brain radiation therapy with simultaneous integrated boost (WBRT+SIB) is an understudied issue, even in RTOG 9508. However, this effect has a significant impact on the quality of life of patients. We have currently found a technical solution to this problem. Our current protocol for WBRT+SIB is presented and described, incluiding a retrospective review of the results in relation to radiation-induced alopecia.
Materials and Methods: The protocol already implemented in our department is based on a frame-less procedure compatible with masks of type 35764/2MA/M (Orfit Industries N.V., Wijnegem, Belgium), submasks of eXaSkin (Anatomical Geometry S.L., Sevilla, Spain) and a resonance compatible frame eXaFrame (Anatomical Geometry S.L., Sevilla, Spain). CT and MR studies of 1mm slice thickness are acquired with similar length, position and inmovilization. The whole procedure and the resulting high quality fussion is ensured by the eXaFrame system. Treatments were designed using VMAT in Treatment System Planning Pinnacle V.9.2 (Philips N.V, Koninklijke Holland) with multiple arcs, and delivered with a linear accelerator Elekta Synergy (Elekta A.B., Stockholm, Sweden). The dose scheme used is the one reported by Lagerwaard: [WBRT(20Gy) + SIBmts (40Gy)]/5 fr. Patient positioning is verified daily using IGRT with Elekta XVI, before and after treatment. Before optimization is performed, some auxiliary volumes are created: a 3mm ring around calota,called Follicles, and a volume contracted 12mm from the outer one, called CPE. Two CCW VMAT arcs (178° to 60° and 300° to 182°) are added, with the following objectives: Follicles (EQD_2max = 16 Gy, weight = 20; EQD_2max = 5 Gy,

weight = 1), brain-CPE (Dmax = 21 Gy, weight = 100 and Dmin = 20 Gy, weight = 50), eyes(Dmax = 10 Gy, weight = 1). Thereafter, we work separately on the metastases blocking the optimization of the prophylaxis and creating three structures: VI1 = PTV (MTS1)+ 5 mm, VI2 = PTV (MTS2)+ 5 mm, Epx = brain-VI1-VI2. Objectives were: PTVI (Dmax = 44 Gy, weight = 100 and Dmin = 40 Gy weight = 50), Epx (Dmax = 30 Gy) ,brain stem (Dmax = 23 Gy) and Follicles (EQD_2max = 16 Gy, weight = 20; EQD_2max = 5 Gy, weight = 20).

Results: We have treated 14 patients until now. Fusion images have shown differences less than 1mm while mean IGRT correction has been 1.34mm. No acute toxicity have been observed, including neither alopecia nor temporal depilation.

Conclusions: This protocol has been designed and developed in our hospital, considering the alopecia as toxicity in VMAT optimization. It produces excellent cosmetic results, avoiding alopecia in practically all cases, which has a direct impact on patient quality of life. As a general consideration, we would like to point out that that it should be considered mandatory to use all advanced tools available on modern radiotherapy to minimize toxicity in radiation treatments.

Electronic Poster: Clinical track: Early phase trials

EP-1360

Trial sponsorship, self-reported conflicts of interest of authors in breast cancer irradiation

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Purpose/Objective: Profit organizations (PO) funding plays an important role in research development. Most of these sponsorships eventually targets to fund drugs, or industry based research. PO may also comprise some level of conflict of interest (COI). We aim to assess and test any association between study conclusions and self-reported COI or trial sponsorship in breast cancer irradiation.

Materials and Methods : We searched PubMed for all clinical trials (CTs) published between 09/2004 and 09/2014 in breast neoplasm (*Mesh*). All articles published in this period were manually screened for eligibility. We included only radiotherapy CTs with clinical endpoints. Two investigators independently selected phase 2 and 3 CTs with at least 50 patients published in English and related to radiotherapy. We classified eligible trials according to the type of intervention, funding source, presence or absence of conflict of interest, study conclusion and region/period of publication.

Results: We retrieved 1,603 CTs of which seventy-six (4.7%) were selected. Seventy-two RCTs (4.4% of all CTs) were eligible. For - PO, not-for-profit organization (nPO) (association or foundation), none and not reported sponsorship rates were 12.5%, 48.6%, 1.4%, 37.5%, respectively. Positive COI were reported in 8.3% of CTs and were negative or not reported in 59.7% and 32%, respectively. Eleven journals were responsible for all publications, the 'International Journal of Radiation Oncology Physics Biology' and the 'Radiotherapy and Oncology' being responsible for 55.5% of the publications. Americans were committed with 68.2% of sponsorship (profit and non-profit) and also reported 66.6% of positive COI. There was no significant association between study conclusion (positive or negative) and funding source (funded versus no funding; *P=0.569*). However, positive COI were associated with positive conclusion (*P=0.0001*). When comparing high impact journal (factor of impact ≥ 4.0 and low < 4.0) and low impact journal we found no association with positive conclusion (*p=0.182*), nevertheless 76.4% of the CTs were published in high impact factors. There was no association between region and sponsorship (*p=0.45*).

Conclusions: In this 10-year analysis, PO association played the major role in radiotherapy breast funding. No significant association between study conclusion (positive or negative) and funding source was noticed. Nevertheless self-reported COI were associated with positive conclusions.

Electronic Poster: Physics track: Basic dosimetry and phantom detector developments/characterisation

EP-1361

Comparison of 4 multichannel radiochromic film dosimetry procedures

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Purpose/Objective: In this work 4 multichannel radiochromic film dosimetry calibration procedures are compared. They are based on the following bibliography and we will name them as: 1)Micke[1], 2)Mayer[2],3)Mendez[3] and 4)the ratio between the red and the blue channel[2]. All these methods (except nº 4) use enhanced dosimetry procedures which allow the separation and removal of the dose-independent part of the scanned signal. These procedures introduce channel-independent perturbations to finally obtain the absorbed dose without the spurious scanned signal.

[1] Micke. M.Phys. 11.
[2] Mayer. M.Phys. 12.
[3] Mendez. M.Phys. 14.

Materials and Methods: To compare the procedures, 10 IMRT fields were irradiated. Film dose distributions (using EBT3 radiochromic film) were compared with their respective planned dose distributions (TPS) obtained with XiO and with their measured dose distributions using a 2D Array. A γ-index analysis was used to compare the distributions. The complexity of the procedures was assessed as well.

To implement all these procedures cited previously, image registration tools were used, e.g. to register the planned distribution and the measured film image of a wedge field to perform the film calibration in the Mendez method, and MULTISTART optimization tools also to obtain the perturbation parameters introduced by Mendez[3].

Results: All the methods obtained very good results (100% of points passed the γ criteria when used 3 or even 2 mm, regardless of the dose difference %). This demonstrated the methods work well and the implementation is correct. Therefore a new γ comparison (1%-1mm) was made to appreciate some differences. The Micke and Mayer methods,